ADDITIONAL NOTES ON THE GENUS PETREA. VIII

Harold N. Moldenke

PETREA MARTIANA Schau.

Additional bibliography: Mold., Phytologia 42: 310 & 318. 1979.

The flowers on Prance & al. P.25519 are said to have had the "outer petals light-purple, inner petals dark-purple; inner petals missing from most" -- by "outer petals" they probably are referring to the calyx-lobes.

Macbride (1960) cites Fox 96 from Loreto, Peru. The Ducke 872 & 1133 and Fróes 22628, cited below, were previously incorrectly reported by me as P. bracteata Steud. On the other hand, the Ducke 14291 and Sampaio 5092 [Herb. Nac. Rio Jan. 19128] previously reported by me as P. martiana prove to be the more recently described P. martiana var. glabrescens Mold.

Additional & emended citations: BRAZIL: Amazônas: Ducke 872 (N), 1133 (N); Fróes 22628 (N); Prance, Pena, Ramos, & Monteiro 3793 (N). Pará: Cavalcante 2392 (Ld, N); Prance, Silva, Balick, Henderson, Nelson, Bahia, & Reis dos Santos P.25519 (N). Rondônia: Prance, Rodrigues, Ramos, & Farias 8256 (Ld, N, Z). MOUNTED ILLUSTRATIONS: Schau. in Mart., Fl. Bras. 9: pl. 46, fig. 1. 1851 (N, Z).

PETREA MARTIANA var. GLABRESCENS Mold., Phytologia 32: 458. 1975.

Bibliography; Mold., Phytologia 32: 458 (1975) and 34: 257 & 259. 1976; Hocking, Excerpt. Bot. A.28: 259. 1976; Mold., Phytologia 42: 318. 1979.

This variety differs from the typical form of the species in having at least its mature leaf-blades glabrous or glabrescent and not at all scabrous or even scabrellous above.

Collectors describe this plant as a scandent woody vine, the calyx light-blue or lavender, enlarged in fruit, and have found it growing at the edges of woods, in whitewater varzea forests, and on terra firme at the edges of partial clearings, flowering in February and from May to July. The corollas are said to have been "violet" on Ducke 14291, "purplish" on Mathias & Taylor 5093, "purple" on Campbell & al. P.22257, and "purple with a white spot at the base of one lobe" on Mori & al. 9131.

Material has been misidentified and distributed (and even erroneously cited by me in a previous work) as P. macrostachya Benth. and as typical P. martiana Schau.

Citations: PERU: San Martín or Loreto: Mathias & Taylor 5093 [Aguaytía] (W--2653024). BRAZIL: Amazônas: Mori, Prance, Hill, Bernardi, & Shimabukuru 9131 (Ld, N). Pará: Campbell, Ongley, Ramos, Monteiro, & Nelson P.22257 (N, Z); Ducke 14291 (N--type); Sampaio 5092 [Herb. Rio Jan. 19128] (N).

PETREA MAYNENSIS Huber, Bol. Mus. Para. 4: 602. 1906.

Additional synonymy: Petrea mayensis Huber ex Dwyer, Raymondiana 4: 71, sphalm. 1971.

Additional & emended bibliography: Prain, Ind. Kew. Suppl. 4, imp. 1, 177 (1913) and imp. 2, 177. 1958; R. C. Foster, Contrib. Gray Herb. 184: 170. 1958; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 663, 665, & 666. 1960; Mold., Résumé Suppl. 12: 5. 1965; Mold., Phytologia 7: 440. 1961; A. María, Pl. Vall. Cochab. 2: 42. 1966; Dwyer, Raymondiana 4: 71. 1971; Mold., Fifth Summ. 1: 119, 142, 169, 183, & 366 (1971) and 2: 598 & 898. 1971; Mold., Phytologia 25: 242. 1973; Troncoso, Darwiniana 18: 366, 367, 369, & 411. 1974; Soukup, Biota 11: 14. 1976.

Recent collectors refer to this plant as a climbing shrub, 2--3 m. tall, or as a vine or liana, 6--9 m. tall [long], climbing over shrubs, or even as a small tree, 2--5 m. tall, the leaves coriaceous, rough or even very rough and sandpaper-like, deep- or olive-green, brilliantly shimmering, the flowers fragrant or slightly so, and the calyx ["bracts"] pale-violet 2.5 P 8/4 or pale-blue to "pale whitish-cream". They have found it growing in cerrado as well as in low or high forests, secondary and disturbed forests on terra firme, and clearings in forests, at 400--950 m. altitude, flowering in January, April, May, and July to October, fruiting in July and August.

The corollas are said to have been "blue" on Maguire & al. 56867, "pale-blue" on Forero & Wrigley 7106, "deep-blue" on Prance & al. 6224, "purple" on Schunke 2131, "pale-purple" on Woytkowski 7246, "violet 2.5 P 4/9" on Schunke 4978, "moderate violet 2.5 P 3/8" on Mathias & Taylor 3682 & 6088, "blue tinted violet and yellow" on Forero & al. 6344, "lilaz até violaceo-clara" on Ducke s.n., "white with green hue" on Woytkowski 7640, and "gray-green" on Forero & Wrigley 7134. It is suspected that the last two mentioned color descriptions refer to fruiting-calyxes rather than to corollas.

Ducke reports the species frequent in Pará, Brazil. The vernacular name, "yahua-piri-piri", is recorded for it. Dwyer (1971) cites Woytkowski 5471 & 7246 from San Martín and 7640 from Huánuco, Peru. Troncoso (1974) cites Steinbach 3470 from Santa Cruz, Bolivia. Macbride (1960) cites Poeppig 1970 from San Martín and Huber 1489 and Tessman 3960 from Loreto, Peru.

Material of P. maynensis has been misidentified and distributed in some herbaria as P. peruviana Mold.

Additional citations: PERU: Huánuco: Schunke Vigo 2131 (N); Woytkowski 7640 (W--2452961). Loreto: Mathias & Taylor 6088 (W--2704060). Madre de Díos: Soukup & López G. 4621 (Ld). San Martín: Schunke Vigo 3682 (N), 4978 (N), 7720 (W--2780656); Woytkowski 7246 (W--2453309). BRAZIL: Acre: Forero, Coêlho, & Farias 6344 (Ac, N). Mato Grosso: Maguire, Murça Pires, Maguire, & Silva 56867

(Ld). Rondônia: Forero & Wrigley 7106 (Ld, N), 7134 (Ac, N). BOLIVIA: Cochabamba: Collector undetermined 154 (W--2428142). El Beni: H. H. Rusby 932 (Ws), 933 (Ws); Troll 2725 (Mu). Pando: Prance, Forero, Wrigley, Ramos, & Farias 6224 (Ac, N), 6477 (Ld, N). CULTIVATED: Brazil: Ducke s.n. [Belém, 25-8-1941] (Ca--91426). Peru: Scolnik 1176 (N).

PETREA NITIDULA Mold., Feddes Repert. Spec. Nov. 43: 168--170. 1938.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 663 & 665--666. 1961; Mold., Phytologia 7: 440. 1961; Mold., Fifth Summ. 1: 142 & 169 (1971) and 2: 898. 1971; Soukup, Biota 11: 14. 1976; Mold., Phytologia 36: 35. 1977.

Recent collectors refer to this species as a vine, the inflorescences and calyx blue, and have encountered it along roadsides and in disturbed forests, flowering in October. They report for it the vernacular name, "flor de São José". The corollas are said to have been "blue" on Berg & al. P.18404 and "dark-blue" on Prance & al. 15858.

Additional citations: BRAZIL: Amazônas: Prance, Maas, Woolcott, Monteiro, & Ramos 15858 (N, Z). Mato Grosso: Berg, Steward, Ramos, Monteiro, & Lima P.18404 (Ld, N).

PETREA PERPLEXANS (Cockerell) MacGinitie

Additional synonymy: Petraea perplexans (Cockerell) MacGinitie apud R. Pearson, Anim. Pl. Cenoz. Era 33. 1964.

Additional bibliography: Mold., Phytologia 7: 441. 1961; R. Pearson, Anim. Pl. Cenoz. Era 33. 1964; Mold., Fifth Summ. 1: 376, 402, & 422 (1971) and 2: 596 & 898. 1971.

PETREA PERUVIANA Mold., Feddes Repert. Spec. Nov. 43: 206--208. 1938.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 228. 1858; Mold., Geogr. Distrib. Avicen. 22 & 24. 1939; Soukup, Biota 1: 180. 1956; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 663 & 666. 1960; Mold., Phytologia 7: 441--442. 1961; Soukup, Biota 5: 14. 1964; Mold., Résumé Suppl. 16: 5. 1968; Mold. in Menninger, Flow. Vines 338. 1970; Mold., Fifth Summ. 1: 119, 137, & 142 (1971) and 2: 596, 599, & 898. 1971; Soukup, Biota 11: 14. 1976.

Recent collectors describe this plant as a liana, to 7 m. long, climbing on small trees, the stems harshly scabrid, the leaves rigid, harshly scabrid, the fruit "shiny, whitish, surrounded by the silver-white expanded winged sepals", and have found it growing along trails, flowering in November and December, fruiting in February. The corollas are said to have been "blue" on Castañeda 3850 and "violet" on Castañeda 3929. Soukup reports the vernacular name, "senango sacha".

Macbride (1960) cites Klug 170 & 637 and Williams 690 & 8106 from Loreto and Meyen s.n. from Puno, Peru.

The *Schunke Vigo 3682*, distributed as *P. peruviana*, seems, rather, to be *P. maynensis* Huber.

Additional citations: COLOMBIA: Vaupés: *Romero Castañeda 3850* (N), *3929* (N). PERU: Loreto: *D. R. Simpson 739* (N)

PETREA PERUVIANA var. **ACUMINATA** Mold., Feddes Repert. Spec. Nov. 43: 208. 1938.

Bibliography: Mold., Feddes Repert. Spec. Nov. 43: 208. 1938; Mold., Geogr. Distrib. Avicen. 22 & 24. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 34, 35, & 97. 1942; Mold., Phytologia 2: 181 (1946) and 2: 500. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 70, 73, & 192. 1949; Mold., Résumé 80, 84, & 464. 1959; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 666. 1960; Mold., Résumé Suppl. 10: 2 (1964) and 16: 5. 1968; Mold., Fifth Summ. 1: 137 & 142 (1971) and 2: 898. 1971; Soukup, Biota 11: 14. 1976.

Recent collectors describe this plant as a liana, 1.2 m. long, the leaves very coriaceous and tough, the flowers either in axillary racemes or terminating side branches, and the calyx blue. They have found it growing in cutover woods, climbing medium-size trees, in primary and secondary forests, and in the lower canopy of 40-foot trees, at 110--800 m. altitude, flowering in January and September, fruiting in September.

The corollas are said to have been "blue" on *Belshaw 3420* and on *Cazalet & Pennington 7649*, "purple" on *Mexia 6498*, and "lilac and purple" on *Revilla 2115*. Miss Mexia refers to the plant as "frequent"; Revilla encountered it "cerca a purma".

Macbride (1960) cites *Mexia 6498* & *s.n.* and *Williams 647* from Loreto, Peru.

Material has been misidentified and distributed in some herbaria as *P. aspera* Turcz. and *P. volubilis* L.

Additional citations: ECUADOR: Morona-Santiago: *Sparre 19187* (S). Santiago-Zamora: *Cazalet & Pennington 7649* (N, W--2406153). PERU: Loreto: *Mexia 6498* (W--1691255); *Revilla 2115* (N). San Martín: *Belshaw 3420* (Ld, N, Z)

PETREA PUBESCENS Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 211--212. 1863.

Additional synonymy: *Petrea pubeseens* Turcz. ex Soukup, Biota 11: 14, sphalm. 1976.

Additional & emended bibliography: Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 478. 1894; Pittier, Supl. Pl. Usual. Venez. 55. 1939; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 478 (1946) and imp. 3, 2: 478. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 663 & 665--667. 1960; Mold., Phytologia 7: 442. 1961; Mold., Résumé Suppl. 17: 3 & 7. 1968; Mold., Biol. Abstr. 50: 6338 (1969) and 50 (12): B.A.S.I.C. S.154. 1969; Mold., Phytologia 18: 72. 1969; Hocking, Excerpt. Bot. A.15: 422. 1970; Mold., Fifth Summ. 1: 119, 126, 137, 142, 169, & 366 (1971) and 2: 596, 599, & 898. 1971; Mold., Phytologia 25: 228, 234, & 242. 1973;

López-Palacios, Revist. Fac. Farm. Univ. Andes 14: 22 (1974) and 15: 66—69. 1974; Mold., Phytologia 34: 257. 1976; Soukup, Biota 11: 14. 1976; López-Palacios, Fl. Venez. Verb. 452, 454, 460—462, 476—480, 638, & 652, fig. 112. 1977; Mold., Phytologia 36: 45 (1977) and 42: 303, 304, 312, & 313. 1979.

Illustrations: López-Palacios, Fl. Venez. Verb. [477], fig. 112. 1977.

Recent collectors describe this plant as a small, rather columnar, deciduous tree, 4—8 m. tall, branched above the middle, or as a few-branched shrub, 1—5 m. tall, the trunk to 9 cm. in diameter, the leaves thick-subcoriaceous, deep-green and asperous above, rugose, the flowers abundant, the "bracts" violet, the calyx pale-blue, violet-blue, or lavender. They have found it growing on dry hills, at the edge of woods, in deciduous or tropophilous forests, and on mountain savannas with shrubby growth in the gullies, at 140—2320 m. altitude, flowering in January, March to June, August, September, and November. The corollas are said to have been "lavender" on *Gentry & al. 11010*, "purple" on *Aristeguieta 4674*, *Hutchison & Wright 3271*, and *Robertson & Austin 152*, "violet-blue" on *Davidse & al. 5599*, "blue-violet" on *Burkart 16485*, and "blue" on *García-Barriga 18167* & *18182*.

López-Palacios and his associates describe *P. pubescens* as an "arbolito inerme, decidue, 4—6 m. Hojas simples, opositi-decusadas, escabritas por la haz, verde oscuro por el haz, más claras por el envés. Flores grandes, vistosas, ametistinas. Cáliz y corola de color morado intense, salvo la garganta de la corola, cremosa por dentro, base del cáliz púrpura oscuro, glándulas, lóbulos púrpura pálido. Planta muy ornamental durante la floración. Frecuente a orillas de la carreta, vistoso, hermoso super floribundo, melífero". Aristeguieta refers to it as "muy llamativas", while Burkart asserts that it is "very decorative".

The vernacular names, "guamo macho" and "pluma de la reina", are reported for the species. Wurdack comments that *Hutchison & Wright 3271* matches *Lehmann 1872* in the United States National Herbarium at Washington.

Macbride (1960) cites only *Ule 9722* from Peru. López-Palacios cites from Venezuela the following collections: Barinas: *Bernardi 1224*. Lara: *R. T. Smith V.984*; *Steyermark 104926*; *Tamayo 3396*; *Trujillo 2747*. Mérida: *Funck & Schlim 1504*; *Hambury-Tracy 136*; *Ijjasz & Madriz 137*; *Jahn 906*; *Little 15567*; *Ruiz-Terán & López-Palacios 826*. Táchira: *Funck & Schlim 1504*; *García-Barriga 13314*; *Steyermark 98878*. Trujillo: *Quintero & Cavroz 1106*. In his 1975 work he comments about the *Funck & Schlim 1504* type collection: "El ejemplar del B.M. examinado por mí tiene una nota en rótulo, posiblemente no de mano de los colectores, que dice: 'New Granada, A. Amer.' y en el de G. se lee 'Merida-Salomón 400?' Según ésto, el tipo es indiscutiblemente de Venezuela, y si en verdad es de Mérida, Sería de San Cristóbal de Torondoy, de donde no conozco ningún otro registro de esta taxon ni consta que Funck

& Schlim hayan estado allí; pero puede ser también de San Cristóbal, Táchira, región de la que existen numerosos registros y en donde ciertamente estuvo Schlim."

He further notes: "Me parece difícil encontrar P. pubescens a alturas de 100 m. Para Venezuela los registros seguros están a alturas mayores de 1000 m. El registro de Bernardi 1224 a los 300 m. es muy dudoso!"

He continues: "Tampoco la he visto en el Dto. Federal. El Dr. Moldenke cita para allá 2 ejemplares: Golmer s.n. (B) y Bredemeyer s.n. (V). El ejemplar de Golmer debió de haberse destruido en el incendio del herbario de Berlin; he examinado el de Bredemeyer, del herbario de Viena, que en realidad está rótula con el No. 16. Si ésta bien tiene la indicación de procedencia: 'Caracas', no creo que deba tomarse muy al pie de la letra, pues muchos colectores de aquel entonces incluian toda la provincia de Venezuela bajo el nombre de 'Caracas'."

Material of P. pubescens has been misidentified and distributed in some herbaria as P. arborea H.B.K. and P. aspera Turcz. On the other hand, the Aristeguieta 1602 & 3864 and the Aristeguieta & Agostini 4113, cited by me in 1961 as P. pubescens, actually prove to be P. glandulosa Pittier.

Additional citations: COLOMBIA: Cundinamarca: López-Palacios & Idrobo 3693 (N, Z). Huila: Davidse, Gentry, & Llanos 5599 (Ld). Magdalena: H. H. Smith 1521 (Mi, Ws). Norte de Santander: Bruckmüller s.n. [Nova Granada] (N). Tolima: García-Barriga 18167 (W—2844141), 18182 (W—2844302). Valle del Cauca: Holton 512 (Ms—30933); Hutchison & Wright 3271 (Mu, N, S, Ws). VENEZUELA: Aragua: Robertson & Austin 152 (E—2048449). Barinas: Bernardi 1224 (Ve—50305). Guárico: Aristeguieta 4674 (N, Ve). Lara: Burkart 16551 (Ve); Gentry, Morillo, & Morillo 11010 (W—2788958); J. A. Steyermark 104926 (Mu, N); Tamayo 3396 (Ve). Mérida: Little 15567 (Ve—47014); Ruiz-Terán & López-Figueiras 826 (N), 1989 (N). Táchira: Steyermark, Dunsterville, & Dunsterville 98878 (Ac). Trujillo: Oberwinkler & Oberwinkler 15144 (Mu). Yaracuy: Burkart 16485 (Ve).

PETREA PUBESCENS f. ALBICALYX Mold.

This taxon is now regarded as a synonym of P. glandulosa Pittier, which see.

PETREA PUBESCENS var. KLUGII Mold., Feddes Reprt. Spec. Nov. 43: 172--173. 1938.

Synonymy: Petrea pubeseens var. klugii Mold. ex Soukup, Biota 11: 14, sphalm. 1976.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 667. 1960; Mold., Phytologia 7: 442—443. 1961; Mold., Fifth Summ. 1: 137 & 142 (1971) and 2: 898. 1971; Soukup, Biota 11: 14. 1976; Mold., Phytologia 36: 45. 1977.

Macbride (1960) cites only *Klug 4155* from San Martín, Peru.

PETREA RACEMOSA Nees

Additional & emended synonymy: *Peraea racemosa* Nees, Flora 4 (1): 300. 1821. *Petrea racemosa* Nees & Mart., Nov, Act. Soc. Nat. Cur. 11 (1): 72. 1823. *Petraea subserrata* Nees ex Cham., Linnaea 7: 368--369. 1832. *Petraea racemosa* Nees & Mart. ex Cham., Linnaea 7: 369 & 370. 1832. *Petrea subserrata* Cham. & Schlecht. ex Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 211 [as "*subserratae*"]. 1863; Mold., Prelim. Alph. List Inv. Names 35, in syn. 1940. *Petrea denticulata* Schau. ex M. Kunz, Anatom. Untersuch. Verb. 64. 1911. *Petraea sub-serrata* Cham. apud Sampaio, Bol. Mus. Nac. Rio Jan. 13: 231. 1937. *Petraea volubilis* Vell. apud Sampaio, Bol. Mus. Nac. Rio Jan. 13: 231, in syn. 1937 [not *P. volubilis* Gaertn., 1791, nor Haust., 1966, nor Jack, 1947, nor Jacq., 1832, nor L., 1763 & 1919, nor Schau., 1960, nor Willd., 1940, nor Woodr., 1906]. *Petraes volubilis* Vell. apud Sampaio, Bol. Mus. Nac. Rio Jan. 13: 287, in syn. 1937. *Petraea recemosa* Nees & Mart. ex Barroso, Rodriguesia 32: 71. 1957.

Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 338. 1858; Bocq., Adansonia, ser. 1, 2: 99--101 & 135 (1862) and ser. 1, 3: 251, pl. 20. 1863; Bocq., Rév. Verbenac. 99--101, 135, & 251, pl. 20. 1863; Vesque, Ann. Sci. Nat. Paris, ser. 7, 1: 339. 1885; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 478. 1894; Peckolt, Bericht. Deutsch. Pharm. Gesel. 14: 476--477. 1904; M. Kunz, Anatom. Untersuch. Verb. 64--66. 1911; Crevost & Pételot, Bull. Econ. Indochin. 37: 1289. 1934; Sampaio, Bol. Mus. Nac. Rio Jan. 13: 231 & 287. 1937; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 478. 1946; Pételot, Pl. Méd. Cambod. Laos Vietn. 2 [Archiv. Recherch. Agron. Past. Vietn. 18]: 258 (1953) and 4: 25, 145, & 200. 1954; Chittenden, Dict. Gard. 1534. 1956; Angely, Fl. Paran. 7: 12. 1957; Barroso, Rodriguesia 32: 71. 1957; Reitz, Sellowia 11: 76 & 121. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 2: 478. 1960; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 667. 1960; Angely, Fl. Paran. 17: 46. 1961; Mold., Phytologia 7: 443--445. 1961; Rizzini in Ferré, Simpos. Cerrado 113. 1962; Angely, Bibl. Veg. Paran. 207. 1964; Mold., Résumé Suppl. 11: 7. 1964; Angely, Fl. Anal. Paran., ed. 1, 578. 1965; Bernardi & Robert, Fleurs Tropic. 189--190, pl. 21. 1966; Mold., Résumé Suppl. 15: 21 (1967) and 16: 25. 1968; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 266. 1969; Mold. in Menninger, Flow. Vines 338. 1970; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 830, 831, & xiv, map 1376. 1971; Dwyer, Raymondiana 4: 71. 1971; Mold., Fifth Summ. 1: 169, 187, & 366 (1971) and 2: 594--599 & 898. 1971; López-Palacios, Pittiera 5: 47. 1973; López-Palacios, Revist. Fac. Farm. Univ. Andes 9 (13): 56. 1973; Mold., Phytologia 27: 368. 1973; Troncoso, Darwiniana 18: 367, 369, & 411. 1974; López-Palacios, Revist. Fac. Farm. Univ. Andes 15: 67. 1975; Mold., Phytologia 41: 450 (1979) and 42: 315. 1979.

Additional illustrations: Crevost & Pételot, Bull. Econ. Indochin. 37: opp. 1288. 1934; Bernardi & Robert, Fleurs Tropic. pl. 21 (in color). 1966.

Recent collectors describe this plant as a vine or liana, a semi-climbing or scandent shrub, or a tree to 3 m. tall, the leaves caducous, the inflorescence ornamental, with the pedicels and calyx blue. They have found it growing in capoeira, the borders of thickets, and along river edges, as well as in "orla matinha de galeria", flowering from September to November, fruiting in November. The corollas are said to have been "blue" on Héringer 11553 and Pereira 7161, "violet" on Hatschbach 24863 & 32638, Hatschbach & Kummrow 34824, and Sampaio 8232, and "rose" on Sidney & Onishi 996/227. Vernacular names reported are "cipó azul", "flor de S. Miguel", "flor-de-São-Miguel", "flor-de-viuva", "touca da viúva", "touca de viúva", "toucado de viuva", and "viuvinha".

Peckolt (1904) gives a detailed chemical analysis of the plant and reports the use of the leaves in Brazil as a diaphoretic and excitant.

Crevost & Pételot (1934) erroneously reduce P. kohautiana Presl to synonymy here and avers that P. racemosa is "cultivée dans tout le Vietnam comme plante d'ornament. - Originaire des Antilles [this applies only to the P. kohautiana which he regards as cospecific]. Nous ne lui connaissons aucun usage médicinal au Vietnam. D'après Hubert...les feuilles sont diaphorétiques et excitant. Les feuilles, en raison de ses aspérités silicifiées, sont parfois employées comme polissoirs, pour nettoyer les métaux, l'ivoire et la corne".

López-Palacios (1973) reports that some specimens of this species exhibit both opposite and ternate leaves. Chittenden (1956) calls it the "commonest species in gardens [in England], citing the illustration in Bot. Mag. pl. 628 and Lodd., Bot. Cab. pl. 736, "both as P. volubilis", the corollas said to be "violet, blue, or lilac".

Macbride photographed the type specimens of the synonymous P. denticulata Schrad. in Geneva as his type photograph number 7874 and a cotype of Petraea subserrata Cham. in Berlin as his type photograph number 17575.

The Angely (1971) work cited in the bibliography above is often cited by the incorrect titlepage date of "1970".

Barroso (1957) cites Brade 15096 "lote 15RB28.200" and reports the species from Rio de Janeiro, São Paulo, Minas Gerais, and Pará. Dwyer (1971) cites Woytkowski 5642 from Amazonas, Peru.

Material of P. racemosa has been misidentified and distributed in some herbaria as P. volubilis L. On the other hand, the Teixeira 2559 [Herb. Serg. Tavares 1513], distributed as P. racemosa, actually is P. blanchetiana Schau.

Additional citations: BRAZIL: Distrito Federal: Héringer 11553 (N, N). Goiás: Prance & Silva 59470 [L.S.143] (N, N, N, S); Sidney & Onishi 996/227 (Ld). Minas Gerais: A. Castellanos 24099

[Herb. Cent. Pesq. Florest. 3009] (Ac); Froés 33439 (S); E. Pereira 7161 [Herb. Brad. 23552] (Mu, N). Paraná: Dusén 10745 (Mu), 15874 (Mu); Hatschbach 24863 (N, W—2706731), 32638 (Ld). Pernambuco: Pickel 3112 (Mi). Rio de Janeiro: Martius s.n. [Macbride photos 7874] (N--photo, W--photo); Sampaio s.n. [Campos, VIII/1939] (Ja--45381, Ja). São Paulo: I. S. Gottsberger 16 [6] (Ld); Hatschbach & Kummrow 34824 (Ld); Santoro s.n. [Herb. Inst. Bot. S. Paulo 678] (W--1594549); Válio 47 (W--2369417). State undetermined: Sellow s.n. [Macbride photos 17575] (N—photo, W—photo). CULTIVATED: Brazil: Reitz 6255 (W--2402936); Reitz & Klein 11249 (W--2402937); Sampaio 8232 (Ja--45374, Ja), 8408 (Ja--45370). MOUNTED ILLUSTRATIONS: Schau. in Mart., Fl. Bras. 9: pl. 45, fig. 2. 1851 (N, Z).

PETREA RACEMOSA f. ALBA (Kuhlm.) Mold., Phytologia 41: 450. 1979.

Additional synonymy: Petrea racemosa var. alba Kuhlm. ex Mold., Phytologia 7: 445. 1961.

Bibliography: Kuhlm., Flores Bras. 2: 30. 1955; Mold., Résumé 104, 221, & 464. 1959; Angely, Fl. Paran. 16: 68 (1960) and 17: 46. 1961; Mold., Phytologia 7: 445. 1961; Angely, Fl. Anal. Paran., ed. 1, 578. 1965; Mold., Fifth Summ. 1: 169 & 366 (1971) and 2: 898. 1971; Mold., Phytologia 41: 450. 1979.

PETREA RIPARIA Mold., Feddes Repert. Spec. Nov. 43: 194--195. 1938.

Additional bibliography: Mold., Phytologia 7: 445. 1961; Mold., Fifth Summ. 1: 169 (1971) and 2: 898. 1971; López-Palacios, Revist. Fac. Farm. Univ. Andes 17: 48. 1976; Mold., Phytologia 34: 256 & 259. 1976.

Recent collectors describe this plant as a vine climbing on trees, 2 m. long, a shrub 2--3 m. tall, or a "parasita", and have found it in flower in March, April, and October. The flowers are said to have been "dark-lilac" on Oliveira 4211, "light-purple" on López-Palacios 3928, "vermelha-amareladas, muito atraentes" on Fróes 25053, and "rose, ovary yellow" on Raimundo S.P.1131.

López-Palacios (1976) cites only his no. 3928 from Colombia.

Additional citations: COLOMBIA: Santander: López-Palacios 3928 (Ld). BRAZIL: Amazônas: Fróes 25053 (N). Bahia: Raimundo S.P. 1131 (N). Pará: E. Oliveira 4211 (N).

PETREA RIVULARIS Mold., Feddes Repert. Spec. Nov. 43: 191—192. 1938.

Additional bibliography: Mold., Phytologia 7: 445. 1961; Mold., Fifth Summ. 1: 130 (1971) and 2: 898. 1971; Mold., Phytologia 23: 418. 1972; López-Palacios, Revist. Fac. Farm. Univ. Andes 17: 48. 1976.

Recent collectors describe this plant as a liana, the calyx white to pale-green, and have encountered it on terra firme, flowering in July and August. López-Palacios describes it as an "arbolito de 5—7 m x 10--12 cm de diámetro, flores violáceo claro, notoriamente bracteadas". He cites (1976) only his *no. 3655* "que aunque colection en Marco, al otre lado de la frontera con el Brasil, puede hallarse también en Leticia, Amazonas".

Additional citations: BRAZIL: Amazônas: *López-Palacios 3655* (N, Z); *Prance*, *Maas*, *Atchley*, *Steward*, *Woolcott*, *Coêlho*, *Monteiro*, *Pinheiro*, & *Ramos 14640* (N).

PETREA ROTUNDA Potbury, Carnegie Inst. Wash. Publ. 465: 79, pl. 14, fig. 3. 1935.

Synonymy: *Petrea? orbicularis* Gilmore ex Mold., Feddes Repert. Spec. Nov. 43: 17, in syn. 1938. *Petraea rotunda* Potbury ex R. Pearson, Anim. Pl. Cenoz. Era 30. 1964.

Bibliography: Potbury, Carnegie Inst. Wash. Publ. 465: 79, pl. 14, fig. 3. 1935; Mold., Feddes Repert. Spec. Nov. 43: 17--18. 1938; Mold., Geogr. Distrib. Avicen. 41. 1939; Mold., Prelim. List Inv. Names 35. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 75 & 97. 1941; Mold., Alph. List Inv. Names 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 166 & 192. 1949; LaMotte, Geol. Soc. Am. Mem. 51: [Cat. Cenoz. Pl. N. Am.] 246. 1952; Mold., Résumé 226, 332, & 464. 1959; R. Pearson, Anim. Pl. Cenoz. Era 30. 1964; Mold., Fifth Summ. 1: 376 (1971) and 2: 598 & 898. 1971.

Illustrations: Potbury, Carnegie Inst. Wash. Publ. 465: pl. 14, fig. 3. 1935.

PETREA RUGOSA H.B.K., Nov. Gen. Sp. Pl., ed. folio, 2: 228 [as "*Petraea*"]. 1817.

Additional synonymy: *Petraea rugosa* H.B.K., Nov. Gen. Sp. Pl., ed. folio, 2: 228. 1817. *Petraea rugosa* Humb. & Bonpl. apud Steud., Nom. Bot., ed. 1, 606. 1821. *Petrea obtusifolia* Benth. apud Schau. in A. DC., Prodr. 11: 619, in syn. 1847. *Petrea rugosa* var. *rugosa* [H.B.K.] ex Mold. in Woodson, Schery, & al., Ann. Mo. Bot. Gard. 60: 82. 1973.

Additional & emended bibliography: H.B.K., Nov. Gen. Sp. Pl., ed. folio, 2: 228 (1817) and ed. quart., 2: 282. 1818; Sweet, Hort. Brit., ed. 1, 1: 323. 1826; G. Don in Loud., Hort. Brit., ed. 1, 247. 1830; Sweet, Hort. Brit., ed. 2, 417. 1830; Cham., Linnaea 7: 369 & 370. 1832; G. Don in Loud., Hort. Brit., ed. 2, 247. 1832; Loud., Hort. Brit., ed. 2, 551. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; Sweet, Hort. Brit., ed. 3, 551. 1839; Schau., Linnaea 20: 482. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 338. 1858; Bocq., Adansonia, ser. 1, 3: [Rev. Verbenac.] 251. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 478. 1894; Barnhart, Bull. Torrey Bot. Club 29: 590. 1902; Knuth, Feddes Repert. Spec. Nov. Beih. 43: [Init. Fl. Venez.] 605. 1927; MAHA Mag. 10: 56. 1940; Robledo, Lecc. Bot. 2: 499. 1940; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 478 (1946) and imp. 3, 2: 478. 1960; Mold., Phytologia 7: 445--446. 1961; Corner & Watanabe, Illustr. Guide Trop. Pl. 764. 1969; El-Gazzar & Wats., New Phytol. 69: 456, 483, & 485. 1970; Mold., Fifth Summ. 1: 119, 126, & 367 (1971) and 2: 596--598, 767, & 898. 1971; Mold. in Woodson, Schery, & al., Ann. Mo. Bot. Gard. 60: 82--83 & 147. 1973; El-Gazzar, Egypt. Journ. Bot. 17: 75. 1974; Gibbs, Chemotax. Flow. Pl. 3: 1754. 1974; López-Palacios, Pittieria 6: 13 & 28. 1974; López-Palacios, Revist. Fac. Farm. Univ. Andes 15: 69--70. 1975; Kunkel, Excerpt. Bot. A.26: 416. 1976; Mold., Phytologia 34: 256 & 270 (1976) and 36: 40. 1977; López-Palacios, Fl. Venez. Verb. 652. 1977; Mold., Phytologia 41: 450. 1979.

Additional illustrations: Corner & Watanabe, Illustr. Guide Trop. Pl. 764. 1969.

Recent collectors describe this plant as a scandent or virgate shrub, 1--4 m. tall, the leaves stiff and hard, very rough and harsh, bullate, the inflorescence very showy, and the calyx purple. They have encountered it on open shrubby slopes and dry sandy ridges fully exposed to the sun, at altitudes of 80--1400 m., flowering in February, May, and July to September, fruiting in July. The corollas are said to have been "bright-blue" on *Haught 2103*, "purple-blue" on *López-Palacios 3867*, "blue-purple" on *López-Palacios & Idrobo 3838*, "light-purple" on *López-Palacios & Idrobo 3703*, and "purple with pale center" on *Barclay & al. 3461*, while Corner & Watanabe (1969) describe them as "violet-blue".

Vernacular names reported for the species are "azulina", "azulino carrasposo", "azulito", "chaparrito", "chicharrón", "copo morado", "mamoncillo", "mayadena", "pavita", "pluma de la reina", "plumilla", "plumito", "rough-leaved petrea", and "sombrerito".

Macbride photographed the type specimen of *P. rugosa* at Paris as his type photograph number 39477. López-Palacios, after careful study of this type and other relevant material, as well as field work, thinks that it was not collected at Caracas, as stated by Schauer (1847), but, rather, at Honda in Tolima, Colombia. In fact, he definitely excludes the species from the native Venezuelan flora. Sweet (1826) asserts that it was introduced into cultivation in England in 1824 from "Caracas". Knuth (1927) also still lists the type Humboldt & Bonpland collection as from Caracas.

The revised Humboldt, Bonpland, & Kunth dates for the original publication of the name, *P. rugosa*, were verified by Barnhart (1902).

Gibbs (1974) reports syringin absent from the stems of this species and a negative result with the HCl/methanol test.

Material of *P. rugosa* has been misidentified and distributed in some herbaria as *P. volubilis* L. On the other hand, the *Holton 512*, distributed as *P. rugosa*, actually is *P. pubescens* Turcz.

Additional citations: COLOMBIA: Antioquia: *F. A. Barkley 38C494* (Z). Caldas: *Haught 2103* (W--1742367); *Uribe Uribe 6442* (N). Córdoba: *López-Palacios 3867* (N, Tu). Cundinamarca: *Barclay, Juajibioy, & Gama 346* (W--2702185). Huila: *L. A. Bermúdez 34935* (Ca-44399). Magdalena: *Purdie s.n.* (Pd). Tolima: *Dryander 2303* (Bm);

Humboldt & *Bonpland* *s.n.* [Macbride photos 39477] (N--photo of type, N--photo of isotype, P--type, P--isotype, W--photo of type, Z--photo of type, Z--photo of isotype). Valle del Cauca: *López-Palacios* & *Idrobo* *3703* (Ac, N), *3838* (Ld). Department undetermined: *Mutis* *448* (W--1562713), *899* (W--1562714), *914* (W--1562715), *4183* (W--1562716), *4428* (W--1562718).

PETREA RUGOSA f. CASTA (Mold.) Mold., Phytologia 41: 450. 1979.

Synonymy: *Petrea* *rugosa* var. *casta* Mold., Feddes Repert. Spec. Nov. 43: 48. 1938. *Petrea* *arborea* var. *alba* Hort. ex Mold., Feddes Repert. Spec. Nov. 43: 48, in syn. 1938.

Bibliography: Mold., Feddes Repert. Spec. Nov. 43: 48. 1938; Mold., Geogr. Distrib. Avicen. 39. 1939; Mold., Prelim. List Inv. Names 34. 1940; Mold., Alph. List Inv. Names 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 74 & 97 (1942) and ed. 2, 162 & 192. 1949; Mold., Résumé 221, 232, & 469. 1959; Mold., Fifth Summ. 1: 367 (1971) and 2: 597 & 898. 1971; Mold. in Woodson, Schery, & al., Ann. Mo. Bot. Gard. 60: 83 & 147. 1973; Mold., Phytologia 34: 256 & 270 (1976), 36: 40 (1977), and 41: 450. 1979.

Recent collectors describe this plant as a shrub, 1--3.5 m. tall, the calyx pure white. The corolla is also said to have been "white" on *López-Palacios* & *Idrobo* *3704*, but "blanca con tinta lila" on their *no. 3831*.

Additional citations: COLOMBIA: Cauca: *López-Palacios* & *Idrobo* *3831* (N, Z). Valle del Cauca: *López-Palacios* *3704* (Ld). CULTIVATED: Colombia: *López-Palacios* *4033* (Ld).

PETREA SCABERRIMA Mold., Feddes Repert. Spec. Nov. 43: 177--179. 1938.

Additional bibliography: Mold., Phytologia 7: 446. 1961; Mold., Fifth Summ. 1: 119 (1971) and 2: 898. 1971.

PETREA SWALLENI Mold., Feddes Repert. Spec. Nov. 43: 192--194. 1938.

Additional bibliography: Mold., Phytologia 7: 446. 1961; Mold., Fifth Summ. 1: 169 (1971) and 2: 898. 1971.

PETREA VOLUBILIS L., Sp. Pl., ed. 1, imp. 1, 2: 626. 1753.

Additional & emended synonymy: *Petraea* (*volubilis?*) *mexicana* Schiede ex Cham., Linnaea 7: 367. 1832. *?Petroea* *volubilis* Hort. ex Neumann, Ann. Fl. Pom. 1837/1838 254--255, pl. 32. 1838; Grindal, Everyday Gard. India, ed. 16, 40 & 81. 1960. *Petrea* *subserrata* Bárcena apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 478. 1894 [not *P.* *subserrata* Cham., 1832]. *Stachytarpheta* *volubilis* Solereder, Syst. Anat. Dicot. 712. 1899. *Petraea* *volubilis* Woodr. apud Cooke, Fl. Pres. Bomb., ed. 3, 437, in syn. 1906. *Stachytarpheta* *volubilis* Vesque apud D. H. Scott in Solereder, Syst. Anat. Dicot. [transl. Boodle & Fritsch] 1: 630, hyponym. 1908. *Petrea* *adiliaea* Goyena, Fl. Nicarag. 566. 1911. *Petrea* *guranensis* Cham. ex Mold., Feddes Repert. Spec. Nov. 43: 33, in syn. 1938. *Petrea staphylea* ex Mold., Feddes Repert. Spec. Nov. 43: 33, in syn. 1938. *Petrea volubulis* L. ex Rao, Journ. Indian Bot. Soc. 31: [297], sphalm. 1952. *Petrea arborescens* Pesman, Meet Fls. Mex. 266. 1962. *Petraea vulubilis* Jacq. ex Datta, Handb. Syst. Bot. 182. 1965. *Petraea volubilis* Haust. ex Datta & Majumdar, Bull. Bot. Soc. Beng. 20: 102. 1966. *Petrae volubis* Anon., Brit. Honduras postage stamp Minkus 281. 1972. *Petrae volubilis* Anon. ex Mold., Phytologia 25: 242, in syn. 1973. *Petrae volubis* Hatcher in Scott, Stand. Post. Stamp Cat. 133 (1): 212. 1976.

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Recent collectors describe this species as a large or small, woody, ornamental vine or strong, high-climbing liana reaching to the treetops, often to 7 m. tall, or sometimes a tall undershrub, 1--2 m. tall, or even a tree, 10--13 m. tall, profusely flowering, the stems scandent, clambering, or twining, the leaves rough-surfaced and harsh, the calyx papery, persistent for 1--2 months, blue, light- or sky-blue, pale lavender-blue, purplish-blue, pale blue-purple, or lavender, usually much paler than the corolla, in fruit enlarging and becoming greenish, the corolla early deciduous, leaving the persistent usually light-blue calyx with the developing fruit.

The corollas are described as having been "blue" on *Breedlove 9016*, *Dorantes Lopez 520*, *Gimate L. 911*, *King 4307*, *Lundell 17938*, *MacDougall 598S*, *H.279*, & *H.357*, *Moldenke & al. 28131*, Nairne (1894), *Neale 5174*, and *Sumithraarachchi & Sumithraarachchi DBS. 77*, "light-blue" on *Troll 279*, "pale-blue" on *D'Arcy 5927*, "dark-blue" on *Foster 780* and *Hansen & al. 1759*, "purplish-blue" on *Moldenke & al. 28344*, "gray-blue" on *Brumbach 8325*, "dark-blue or blue-violet" on *Burger & Stolze 5190*, "bluish-purple" on *Lundell 16883*, "blue-lavender" on *Lundell 15637*, "lavender" on *Liesner & Dwyer 1498*, "lavender to blue" on *Kelly 201*, "purple" on *Dickson 1466*, *Dilmy s.n.*, *McVaugh 22468*, and *Ventura A. 1003*, "violet" on *Chavelas P. & Pérez J. ES.805*, *Held & Van Rhijn FC.88*, *Molina R. 20794*, *Nafday 171*, and Williams (1949), and "purple, lower lobe with prominent white spot" on *Bunting & Licht 649*.

Recent collectors have encountered this plant in thickets and secondgrowth, along roadsides, on dry mountainsides and limestone outcrops, in remoral covering ancient ruins and in roadside jungle forests, in limestone soil in disturbed tropical rainforest remnants on steep hilltops and in tropical deciduous forests, in remnant stands of tall wet forest, in the open sun on mountains, in secondary semi-dry forests and low deciduous forests, among primary riparian vegetation, in "orilla de arroyo", and in "bosque perturbado por potrero, suelo arcilloso muy rocoso", at altitudes of 40--1000 meters, flowering from December to July, fruiting in February, March, June, and July. King reports it only "occasional" in San Luis Potosí, Mexico, while both Gimate and Ventura refer to it as "abundant" in Hidalgo and Puebla. Brumbach reports it as escaped in thickets on Captiva Island, Florida.

Quick asserts that the "flower is like a violet", but this is hardly an accurate description! Graf (1963) speaks of the corollas as "violet" in color and the calyx as "lilac-blue". Maheshwari (1963) notes: "Flowers blue or pale-violet, star-like, in terminal, long racemes. Calyx petaloid, rigid.....A handsome plant when in flower. Grown in gardens [in Delhi, India] along walls, pergolas and poles for its blossoms borne in elegant, wreath-like clusters", flowering there from October to April, and cites his no. 526.

The anonymous author of the "Guide to Some East African Trees" (undated) describes the species as a "Pretty tropical American twining shrub flowering twice a year. Flowers are violet and heliotrope. It has many pendulous branches and curious brittle papery leaves. Found in all parts of East Africa except for the very driest parts and the highest altitudes." Parker (1924) points out that "The brightly colored calyx is the most conspicuous portion of the flower and remains showy long after the fall of the corolla", asserting that in the Punjab [India] it flowers in April. Trelease (1967) describes and illustrates the twigs, pith, leaf-scars, and buds as seen in the dormant season and comments that "Though its foliage and flowers are very different, the purple-wreath produces something of the effect of a wisteria when in bloom, the flowers being borne in long hanging clusters. In tropical countries it is frequent as a covering of tree-trunks and hanging from the eaves of houses."

Ghouse and his associates (1976) report microscopic examination of microtome sections of various plant parts of P. volubilis reveal the abundance of stone-cells in every organ. "The abundance of these cells makes the plant very hard, tough and inaccessible for sectioning".

Nair & Rehm (1962) describe the pollen as 3-zonicolpate, spheroidal (diameter 49 mu; range 46--53 mu), the colpi small (7 x 3.5 mu), the ends acute, tenuimarginate, the exine 2.8 mu thick, granulate. Cave (1964) and Sharma (1963) report the chromosome number as 2x = 34. Shah & Unnikrishnan (1969) found axillary bud track connections related to the vascular strand entering the "axillary leaf".

Puff (1978) reports on the structure of the unicellular, heavily silicified leaf trichomes which account for the sandpaper-like texture of the leaves. "The hairs consist of a disc-like base (in mature leaves frequently located in a shallow depression of the epidermis, and therefore usually not easily recognizable) and a conical, sharp tip in the center (previously considered to be the whole hair). The development of these hairs is described, and observations are included about distribution and structure of the other types of nonglandular and glandular trichomes on the leaf blades of P. volubilis."

Griffith & Hyland (1966) list P. volubilis as cultivated in Maryland -- Plant Introduction no. 256311, collection no. S.632 from Queensland, Australia — the "flowers lavender-blue, profuse". Read informs us that in Florida is blooms several times a year. Rzedowski (1963) calls it "an abundant liana" in Mexico. McVaugh refers to it as occasional in deciduous forests in Oaxaca, growing in association with Bursera, Ceiba, Swietenia, and legumes. Kruse speaks of it as a "trepadora leñosa, grande, de flores azules muy vistosas. Se cultiva en los jardines [Guerrero, Mexico]. Su encuentra con frecuencia en una ladera pedregosa cubierta de rocas calizas cristalinas y suoles con pH. 7.5." Pesman (1962) asserts that it blooms three times a year and is one of the "handsomest of all Central American trees". Molina (1974) found it in cultivation in Honduras, Miller (1935) reports it cultivated in the Barbados Islands where it flowers 3 or 4 times a year, the "flowers lasting ten days". Mitchell (1967) found it in cultivation in the Bahama Islands. Alain (1974) records it from Oriente, Las Villas, and Havana, Cuba. Fosberg (1976) reports it as cultivated on St. Croix island, but his record is probably a misidentification of P. kohautiana Presl.

Smith (1978) reports P. volubilis from Lara, Venezuela. Esteva (1969) reports it both cultivated and escaped in that country. LeCointe (1947) says that in Brazil it is "Especial para ornamento de colunas". Loudon (1832) and Sweet (1826) assert that it was introduced into cultivation in England from Veracruz in 1733; as P. stapelsiae Paxt. from "S. Am." in 1824. Chittenden (1956) says P. volubilis has been in cultivation in England "since 1731". Nielsen (1965) avers that it was introduced into west Africa "from So. Am." Lind & Tallantire (1962) record it from cultivation in Uganda; Williams (1949) found it cultivated on Zanzibar and Pemba islands, where it flowers "several times a year". Gledhill (1962) reports it cultivated in Sierra Leone. I have personally seen it in parks in Cairo, Egypt, in 1974. Jafri & Ghafoor, in a personal communication to me, say that it is "sometimes cultivated in our gardens [in Pakistan] for its beautiful, showy, stellate flowers" and that it blooms there from March to May. Voigt (1845) list it as cultivated in India. Patel (1968) reports it cultivated in gardens in Melghat, India, where it flowers in March and April. Srinivasan & Agarwal (1963) list is from gardens in Lahore, while Santapau (1967) reports it from Saurashtra.

Woodrow (1910) says of this plant: "It thrives especially if planted out on the northern side of a house at 2,000 feet altitude; blooms during February to March, and is propagated by layers". Bor & Raizada (1954) give its flowering period is March to April [in India], but "Sometimes with a second flush in October. It does not fruit in this country." Srivastava (1976) describes it as "A very beautiful plant while in blossoms. Cultivated in gardens along walls and poles [in Gorakupur, India]", flowering there from October to April, citing his no. 833. Sharma (1975) found it cultivated in the Punjab. Voigt (1845) claims that it was introduced to Indian gardens in 1841. It is now cultivated in Bihar & Orissa according to Haines (1922) and Maheshwari (1975). Datta & Majumdar (1966) describe it as a "Climbing garden shrub [in India]. Flowers stellate, blue-purple. Flowering from January to March." Grindal (1960) comments that it "blends well with Bouginvillaea" in Indian gardens. Nath (1960) found it cultivated in Burma. Chevalier (1919) says that in Vietnam it blooms from June to December. Tingle (1967) reports it cultivated in Hong Kong. MacDaniels found it "commonly cultivated" in the Philippine Islands.

Steiner (1952) asserts that it is best propagated by cuttings and by layering, and that its growing season in the Philippines starts in January. Hallier (1918) collected it from cultivated plants on Luzon (H. Hallier C.120a) and Java (H. Hallier C.120). Backer & Bakhuizen (1965) inform us that in Java it is "a very common ornamental.

Smith & Tejada describe the plant as a straggling shrub recumbent on shrubs and small trees -- their no. 4526 is voucher for plant samples used in the U. S. Department of Agriculture Cancer Chemotherapy National Service Center's anti-tumor screening program.

Breedlove found it growing in black soil with limestone outcrops in lightly grazed regenerating areas with some shrubs and tree-suckers. Nairne (1894) refers to it as a "very handsome climber". Stewart (1972) calls it "a large climber from Tropical America with large purplish blue persistent calyces." Kuck & Tongg (1955) report that in their area it flowers "periodically, the spring ones best". Mattoon (1958) lists only two sources where plants may be secured by horticulturists. MacMillan (1962) calls it "one of the most beautiful of flowering plants" and says that usually it flowers twice a year in the tropics. Greensill (1966) tells us that it "prefers partial shade under high trees, can be allowed to twine, otherwise prune". Smiley (1960) asserts that it flowers in the "spring or summer, rarely anytime". Pancho describes it as a "climbing woody ornamental vine, flowers bluish in hanging clusters to a foot long at branch-tips, each flower with a bluish-lavender spreading star-shaped calyx which is persistent".

Menninger (1962) notes that Standley & Record refer to this species as P. arborea (a misidentification) when they speak of "a large woody vine.....One of the handsomest of all Central American plants because of the abundance of blue flowers, the color depending chiefly on the calyx lobes which retain their color for a long time". Dakers (1962) notes that "Although it is not often seen P. volubilis is a very lovely plant, usually treated as a climber, for a heated greenhouse. It will grow 20—30 ft. tall and so it is not really suitable for a small greenhouse. The star-like flowers appear in April and May in long trusses and the colour is lilac-blue; unfortunately, the flowers are not long lived. A greenhouse with a minimum temperature in winter of 50° is needed and it is best to grow the plants in a border of really good, well drained soil -- a special bed can be made with John Ihnes Potting Compost No. 3. Plants need plenty of water in summer, but much less in winter and light shade should be given when the sun is bright."

O'Gorman (1961) notes that "The calyx spreads open while the corolla is still a round bud in the center, and it remains after the corolla has fallen so that, at first glance, the vine seems to bear two kinds of flowers. The blooms appear in early spring." Brilmayer (1962) adds that "It can top 30 ft. in tropical climates, but is not overpowering in a ... greenhouse. With favorable conditions it could be outstanding, spilling its flower sprays down in sunny windows. Give [it] warmth, highest possible humidity (spraying the leathery leaves is helpful); rich, light soil kept constantly moist; and full sun except in midsummer. It can't stand cold or dryness of air or soil. If necessary, prune after flowering, but only lightly to thin and shape. Propagated by stem cuttings or seeds." Encke (1960) adds that "Während des Winters sollte die Nachttemperatur nicht über 15° [C.], besser sogar etwas darunter liegen".

Vernacular names reported for *P. volubilis*, in addition to those previously recorded in these notes, are "bejuco de caballo", "blue jasmine", "blue petrea", "bòng xanh", "cacalacaxíhuitl", "capitan lila", "chaparro", "cipó azul", "climbing petraea", "coamecate azul", "colación", "coroa de viúva", "corona de la reina", "cowtongue", "cual mecate", "cualmecate", "cuero de sapo", "dây bông xanh", "desconocido", "fleur de papier" [because of the papery calyx], "flor azul", "flor de papel", "flor de Santa Maria", "flor de Sao Miguel", "flor de viuda", "flor de viúva", "grinalda de viúva", "hoa tía", "hoja chigüe", "jasmine azul", "kudirai valuppu", "lei-poni-pekelea", "lengua de vaca", "opptzimin", "opp-tzimin", "papel de lija", "pascueza de venado", "petrea", "purple petrea", "purple wreath", "purplewreath petra", "purplewreath retrea", "purpurkranz", "queens wreath", "queen's wreath", "raspasombrero", "raspa-sombrero", "sand paper-vine", "sandpaper vine", "Santa Rita", "soltero", "spislákat juki", "Stapelia-like petraea", "tháthub", "totopostillo", "touca de viúva", "toucado", "toucado de viúva", "viuvinha" [a name also applied to the genus *Cinnamomum*], "yochopptzimin", and "yoch-opp-tzimin" [=a horse (or tapir) crackling (or bursting of something dry or hollow)].

Hubert (1921) and Crevost & Pételot (1934) report that *P. volubilis* is employed medicinally as a diaphoretic and expectorant. The two latter authors mistakenly reduce *P. kohautiana* Presl, *P. retusa* Presl, *P. serrata* Presl, and *P. volubilis* Vell. to synonymy here. The species is said also to be used medicinally by the Totonac Amerinds in Mexico. Gibbs (1974) found syringin doubtfully present in the stems, cyanogenesis absent from the leaves, and the HCl/methanol test results negative.

Wheeler s.n. [Winter Haven, Fla., Apr. 20, 1924] and *Herb. Bishop Mus. s.n.*, cited below, have labels that do not specifically indicate that the source plants were cultivated, but I am assuming that they were, although in both regions it is often difficult to determine if a given individual plant was planted by man in that spot or escaped there by natural means.

Walker 8074 bears a label reading "tree, fls. creamy-white, with red centers, called 'cacao' in Vietnam" -- I assume this to be a case of mixed labels.

Mound & Halsey (1978) report *P. volubilis* as one of the hosts for the whitefly, *Trialeurodes floridensis* (Quaint.) Quaint. & Bak.

The here revised dates of publication for the Humboldt, Bonpland & Kunth names involved in the synonymy here are based on Barnhart (1902). The Angely (1971) reference in the bibliography is often cited as "1970", the erroneous titlepage date. It should be noted that the *Stachytarpheta volubilis* credited to Vesque by Scott (1908) does not occur in the Vesque work to which it is cited. Gibson (1970) fails to recognize f. *albiflora* Standl. or var. *pubescens* Mold. as deserving nomenclatural recognition under *Petrea volubilis*, relegating these name to the synonymy of the typical form of the species. The *Petraea mexicana* Willd., cited in the above synonymy, is based on *Herb. Willd. 11490* in the Berlin herbarium, now destroyed.

Goyena (1911) describes his *P. adiliaea*, which I place in synonymy here only tentatively, not having seen the type material, as follows: "Nuestra especie denominada *Hoja chígüe* de hoja pequeña, tiene las hojas, á veces verticiladas por á 3, los racimos son terminales y sus brazos dispuestos: 2 laterales seguidos de otro á un solo lado; los peciolos están acompañados de una bracteíta lanceolado-subulado y parecen artículados con el cáliz, las divisiones calicinales exteriores así como los dientes de cáliz interior azul-claros, la corola erguida, enrodado-bilabiada, exerta, de color violaso, cuyo labio inferior lleva una mancha circular amarillento-blanquecina hacia la base, la denominarémos, si resultase especie nueva, *P. Adiliaea*, en honor de doña Adilia Trejos, esposa del Dr. Julián Irías, quien ordenó la publicación de esta obra, en su calidad de Ministro de Fomento del Gobierno del General Zelaya."

Roys (1931) and Loesener (1912) call what appears to be *P. volubilis* by the name, *P. arborea* H.B.K., an error widely copied in herbaria. Crevost & Pételot (1934) designated it as *P. subserrata* Cham. On the other hand, the "*Petrea volubilis* L." of D'Arcy (1967), cultivated on the island of Tortola, and the "*Petraea volubilis* Jacq." of Richard (1792) probably refer to *P. kohautiana* Presl.

Loesener (1912) cites *Seler 1777* from Oaxaca, Mexicom while Macbride (1960) cites *Soukup 2903* from Peru [probably cultivated]. Jafri & Ghafoor, in a personal communication to me, cite from Pakistan: *Said Qureshi s.n.*, *Said Zaibun & Nuzhat s.n.*, *Shamim s.n.*, *R. R. Stewart s.n.*, and *Sultanul Abedin 9796*. Knuth (1927) cites *Pittier 8855* from Carabobo, Venezuela.

Material of *P. volubilis* has been widely misidentified and distributed in herbaria as *P. arborea* H.B.K., *P. arborea* var. *pubes-*

cens Mold., P. aspera Turcz., Petraea arborea H.B.K., and even as Ceanothus azureus Desf. in the Rhamnaceae. On the other hand, Field Mus. Econ. Pl. 611127, distributed as P. volubilis, actually is P. arborea H.B.K., while Croat 4858, Ducke 9303, Lewis, Dwyer, Elias, & Solís 195, Pittier 11769, and Skog 1205 are P. aspera Turcz.; Mexia 6498 is P. peruviana var. acuminata Mold.; Dusén 10745 & 15874 and Sampaio 8408 are P. racemosa Nees; Mutis 4428 is P. rugosa H.B.K.; Breedlove 9016, Gifford & Totten s.n. [January 1, 1941], Jerabek s.n. [Balboa Park, Jan. 1945] & s.n. [Pacific Beach, April 1945], Kellerman 7738, Laughlin 178, Mell s. n. [near Campeche, Feb. 1945], H. E. Moore 2536, C. V. Morton 7080, R. W. Read X-1-55, Rzedowski 7346, and Ventura A. 3218 are P. volubilis var. pubescens Mold.; and R. M. King 4337 is Carpodiptera ameliae Lundell in the Tiliaceae.

Additional citations: FLORIDA: Polk Co.: H. E. Wheeler s.n. [Winter Haven, Apr. 20, 1924] (Ca--882523). Captiva Island: Brumbach 8325 (N, W--2751468). MEXICO: Campeche: Chavelas P. & Pérez J. ES.805 (Mi); Held & Van Rhijn FC.88 (Ut--328629B); C. D. Mell s.n. [near Campeche, Feb. 1945] (E--1634772, Mi, Se--188030, W--1892608). Chiapas: Breedlove 10681 (Ac, Ld). Guerrero: Crisman & Willis 200 (Mi); Hinton 14135 (Ld, Tu--92067, Tu--112097); Kruse 174 (Ip). Hidalgo: Gimate L. 911 (Sd--89405); Ventura A. 1003 (Sd--78416). México: Troll 279 (Mu). Oaxaca: Converse 45 (Au--201057); Conzatti, Reko, & Makrinius 3001 (E--879029); González Quintero 561 (Ip); Janzen s.n. [6 February 1964] (Ld, Mi); R. Mc Vaugh 22468 (Ip, Mi, Mi); T. MacDougall 598S (N), H.279 (N), H. 357 (N). Puebla: Ventura A. 1003 (Mi, Tu--178761). Querétaro: Paray 567 (Ip); J. Rzedowski 25615 (Mi). San Luis Potosí: Creighton 724 (Bl--6658); R. M. King 4307 (Au--189916, Mi, N); Pringle 5003 (Au--183674, Bl--149840, Ca--168160, Ip, Ld, Tu--134144, Ws), 8004 (Ms--30032); J. Rzedowski 7346 (Ip). Tamaulipas: Crutchfield & Johnston 5201 (Mi); Martin & Saravia 1242 (Ip); Richardson 1230 (Ld); Smith & Barkley 17M174 (Bl--198076, Ip, Tu--156424); J. R. Sullivan 685 (Au--298163). Veracruz: Dorantes López 520 (Ld); Gilly, Simpson, & Dodds 57 (Mi, N); Hansen, Hansen, & Nee 1759 (Mi); I. Kelly 201 (Ba), 201a (Ba); Romero R. 76 (Ip, Ip, Mi); C. L. Smith 1017 (Ba), s.n. [San Francisco, 1894] (Ip); Smith & Tejeda 4526 (W--2471143); Ventura A. 937 (Mi, Sd--78364, Tu--178864). Yucatán: Lundell & Lundell 7329 (Ld), 7413 (Ld). GUATEMALA: Baja Verapaz: Kellerman s.n. [Salama, Mar. 1907] (W--2442027). El Petén: Ibarra 49 (Ld); C. L. Lundell 15637 (Ld), 16842 (Ld), 16883 (Au--228041, Ld, Ld, N, S), 17938 (Au--278470, Ld, Ld); Ortiz 882 (N). BELIZE: Gentle 8867 (Ld); Liesner & Dwyer 1498 (W--2787881); Neale 5174 (Ut--335438B); Proctor 30113 (Ld). HONDURAS: Cortés: C. V. Morton 7837 (W--2023609). Yoro: Dickson 1466 (W--2688856).

BAY ISLANDS: Roatán: Molina R. 20794 (N, W--2751983). NICARAGUA: Zelaya: Bunting & Licht 649 (N, W--2542893). COSTA RICA: Alajuela: Burger & Stolze 5190 (N). PANAMA: Barro Colorado Island: R. Foster 780 (Mi). CUBA: Las Villas: J. G. Jack 4249 (Pd). ECUADOR: Guayas: Valverde 77 (N). INDIA: Maharashtra: Nafday 171 (Ba). INDOCHINA: Vietnam: E. H. Walker 8074 (W--2395330). PHILIPPINE ISLANDS: Luzon: Pancho 3078 (Ws). HAWAIIAN ISLANDS: Oahu: Judd, Bryan, & Neal s.n. [Sept. 25, 1937] (N). CULTIVATED: Bangladesh: Zeysuddin 159 (Kh). Florida: Lawrence 123 (Ba); R. W. Read s.n. [X-1.55] (Ba). Hawaiian Islands: R. S. Cowan s.n. [Aug. 1944] (Ba); F. R. Fosberg 9384 (Bi); Herb. Bishop Mus. s.n. (Bi); Judd, Bryan, & Neal s.n. [Sept. 25, 1937] (Bi); J. F. Rock 2613 (Bi). Java: Dilmy s.n. [Herb. Bogor. Bot. Gard. XI.C.29] (Ba). Massachusetts: W. H. Hodge s.n. [April 1948] (Ma--34196). Mexico: Von Schrenk s.n. [Mar. 1, 1933] (E--1035698). Missouri: D'Arcy 5927 (Ld). Mozambique: Hornby 4107 (Ul). Pakistan: Qureshi s.n. [27.2.1966] (Kh); Qureshi, Zaibunisa, & Nuzhat s.n. [25.3.1969] (Kh). Philippine Islands: MacDaniels 26 (Ba); Quisumbing s.n. [Philip. Nat. Herb. 4355] (Ba). Puerto Rico: Quick s.n. [23 March 1926] (Mi). Sri Lanka: Moldenke, Moldenke, Dassanayake, & Jayasuriya 28344 (Ld, Pd, W--2764543); Moldenke, Moldenke, & Jayasuriya 28131 (Ac, Gz, Kh, Ld, Pd, W--2764556); Sumithraarachchi & Sumithraarachchi DBS.77 (W--2803408). MOUNTED ILLUSTRATIONS: H. N. Moldenke color slide 305 (Z).

PETREA VOLUBILIS f. ALBIFLORA (Standl.) Standl., Field Mus. Publ. Bot. 18: 1012. 1938.

Synonymy: Petrea arborea f. albiflora Standl., Field Mus. Publ. Bot. 11: 140. 1932. Petrea volubilis var. albiflora (Standl.) Mold., Revist. Sudam. Bot. 5: 2. 1937. Petraea arborea f. albiflora Standl. apud Fedde & Schust., Justs Bot. Jahresber. 60 (2): 574. 1941. Petrea volubilis alba Mold. in Menninger, Flow. Vines pl. 191. 1970. Petrea volubilis var. albiflora Mold., Phytologia 26: 375, in syn. 1973.

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[to be continued]